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THE CARPENTER BEES OF THE GALAPAGOS ISLANDS

BY

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The only bee known from the Galapagos Islands is *Xylocopa darwini* Cockerell, which is endemic. It is very closely related to *X. carbonaria* Smith, which was described from Tapajos, Brazil, where it was collected by H. W. Bates. A specimen from Mexico appears to be referable to the same species. The presence of *Xylocopa* in the Galapagos Islands cannot be regarded as evidence in favor of a past continental connection, as these bees nest in wood, and may occasionally be carried across the sea in drifting trees. Enough collecting has been done in the islands to make it seem improbable that there are other endemic bees, though their absence is surprising, considering the varied character of the flora. The type material of *X. darwini* came from Chatham Island. Miss Cheesman (Trans. Ent. Soc. London, LXXVII, 1929, p. 143) described the male, and figured the coxa and trochanter. She found the species on all four islands visited, namely Charles, James, Indefatigable and Albemarle. Williams (Proc. Calif. Acad. Sci., 4 ser. Vol. II, Pt. 2, 1926, p. 356) had previously given a good account of the species, erroneously calling it *X. colona* Lepeletier, which is a species from Cayenne, the wings (female) moderately brown, with a beautiful shining golden color, and a noticeable violet reflection. Williams

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tried to determine whether the specimens from the different islands were all alike. He examined the male genitalia and found them to "vary to a small extent." The most noticeable difference was in the color of the female wings, these showing a greenish-blue iridescence on Charles, Chatham and James islands, and a bluish-purple on Albemarle, Indefatigable and South Seymour.

Miss Cheesman, however, stated that the form of the female with greenish-blue iridescent wings occurred on Charles, James, Indefatigable and Albemarle, and that with bluish-purple iridescence on Charles, Indefatigable and Albemarle. Thus it did not seem possible to distinguish insular subspecies. I have thought it worth while to review the matter with the aid of the series obtained by Mr. Maurice Willows, Jr. on the Templeton Crocker Expedition, these specimens being in the collection of the California Academy of Sciences, along with those earlier recorded by Williams. In addition I have had access to a smaller series collected by John S. Garth on the Hancock Expedition, and now in the Los Angeles Museum.

The specimens may be divided into three groups, as follows:

- (1) Female wings dark, with greenish-blue iridescence; length of wings 17-17.5 mm.

Chatham Island. One male and four females (Williams); one female from Wreck Bay. Two females, Crocker Expedition.

Charles Island. Five males (Williams), four being from Post Office Bay. Nineteen females, variable in size, the wings 15.5 mm. to 17 mm. Special localities are Post Office Bay (Williams) and Cormorant Bay (Willows). The Willows specimens are larger than the average Williams ones.

- (2) Like the last but abdomen more densely and strongly punctured.

James Island. Two males (Williams). Eight females (Willows, Williams and Garth), the wings 16 to 18 mm. long.

Gardner Island (near Hood Island). Two females (Williams): Wing 16 mm.

- (3) Wings dark fuliginous, suffused with rosy; no red hair at tip of abdomen (none in var. 2, sometimes a little on var. 1).

S. Albemarle Island (Williams), five males and seven females. Female wings 16.5-17.5 mm. long.

There are also two males collected by Williams at Sappho Cove, Chatham Island. One female (Williams).

Indefatigable Island. Two males (Williams). Two females collected by Williams, one over 900 ft. alt., two collected by Willows. Length of female wings 16-18 mm.

The Williams specimens have the rosy wings typical of this variety, but one of the Willows specimens has the wings as in var. 1, and the other is intermediate, with much rosy purple.

In addition to the above, J. S. Garth obtained one female on Duncan Island; it has the wings 17.5 mm. long, labrum with three evident tubercles, tergites more densely punctured than in Charles Island specimens. The wings are violaceous, blackish beyond the cells, but outer margin violaceous. Compared with a James Island specimen, the second cubital cell is shorter, its sides on marginal less than half length of second intercubitus (over half length of second intercubitus on James Island specimen).

On comparing a cotype of *X. darwini* (Chatham Island) with a female collected by Garth on Charles Island, they appear different. The *X. darwini* cotype has subtranslucent strongly reddish wings, with feeble iridescence (style of *X. carbonaria* from Mexico); the Charles Island one has very dark, brilliantly blue-green wings. The abdomen is more closely punctured in the cotype. The abdomen is described as very closely punctured in the type of *X. carbonaria*.

Wishing to assemble all the available evidence, I asked Mr. Robert B. Benson to kindly look at the series in the British Museum. This he did, reporting as follows:

"I have looked over our long series of *Xylocopa darwini* from Galapagos Islands. Specimens from Charles Island certainly are less punctured than those from James, Indefatigable and Albemarle islands, but I am not able to recognize any differences in the size, as all forms seem to vary. In the wing coloring, likewise a lot seems to depend on whether the specimens are fresh or not, and I should not like to say that the Charles Island forms were darker than the others. Neither do I feel willing to say for certain that forms can be distinguished on wing iridescence until I have seen a very long series of perfect specimens from each of the islands. For example, we have forms from James Island with dark wings, showing green iridescence, and also with paler wings showing a purple iridescence." (Litt. April 15, 1935.)

To a taxonomist, it would seem agreeable, and to accord with expectation, to find distinct if closely allied races inhabiting the several islands. But Miss Cheesman suggests that the bees occasionally wander from one island to another, and reports seeing a female out at sea, eight miles from Albemarle Island. We may conclude, I think, that there is a tendency to develop insular races, which is checked from time to time by the appearance of immigrants from the other islands. Hence the incipient races, differing in sculpture and wing-color sufficiently to deserve names, were they constant, but

actually too variable for precise definition. According to this view, one might expect that on the larger islands some localities would be inhabited by characteristic types, while at other points, owing to crossing with immigrants, the distinctions would fail to hold. This seems to accord with the facts, as shown for instance on Indefatigable Island, which from its central position might receive immigrants from several directions. To the biologist, these facts are full of interest and the carpenter bees may be said to have done their part, along with the rest of the fauna, to illustrate the processes of evolution.